

J. OTHER GCVTC RECOMMENDATIONS

1. Regulatory History and Requirements

The recommendations of the GCVTC are presented throughout the June 1996 final report with varying degrees of specificity. Not all are included in the Regional Haze Rule. However, some of the recommendations were intended as a menu of options, with no expectation that any geographic area would implement all of them. The GCVTC pointed out in its final report that:

“Some of the Commission's recommendations ask the EPA to take specific **actions** or institute particular **programs**, in cooperation with the tribes, states and federal agencies as implementing bodies. Other recommendations provide a range of potential policy or strategy **options for consideration** by the EPA and implementing entities. As the EPA develops policies and takes actions based on this report, this distinction between "actions" and "options" should be maintained with diligence. That is, recommendations intended as policy options should not become mandated actions or regulatory programs.” [BOLD emphasis in original.]¹

2. Other State of Utah Long-term Strategy Components

a. Evaluation of Additional Grand Canyon Visibility Transport Commission Recommendations.

Pursuant to 40 CFR 51.309(d)(9), Utah has evaluated the “additional” recommendations of the Grand Canyon Visibility Transport Commission to determine if any of these recommendations can be practicably included in this implementation plan. Utah reviewed the GCVTC's 1996 report, *Recommendations for Improving Western Vistas*, to identify those recommendations that were not incorporated into Section 309 of the Regional Haze Rule.

b. Implementation of Additional Recommendations.

Based on the evaluation made by the State of Utah, no additional measures have been identified as being practicable or necessary to demonstrate reasonable progress. *Report to the Environmental Protection Agency and the Public to Satisfy the Requirements of 40 CFR 51.309(d)(9)* includes a complete list of all additional recommendations and their status.² This report reviewed and updated if necessary in 2008, 2013, and 2018.

¹*Recommendations for Improving Western Vistas*, page i.

²Utah Division of Air Quality. *Report to the Environmental Protection Agency and the Public to Satisfy the Requirements of 40 CFR 51.309(d)(9)*. Salt Lake City, Utah. December, 2003.

K. PROJECTION OF VISIBILITY IMPROVEMENT ANTICIPATED FROM LONG-TERM STRATEGY

The Western Regional Air Partnership performed extensive analysis and modeling in order to determine the impact of the regional haze program on visibility at the 16 Class I areas on the Colorado Plateau. This work was performed by several contractors under the direction of various technical and policy forums of the WRAP.

This work began with development of a comprehensive inventory of emissions throughout the region for all categories of sources. In addition, econometric models and new technology profiles were used to project changes in those emissions over time that are expected from implementation of current requirements under the CAA. The WRAP also estimated emission changes resulting from the programs contained in the long-term strategy for regional haze under 40 CFR 51.309.

The emission inventories and projections were used by the WRAP Regional Modeling Center to estimate aerosol concentrations and visibility at each of the 16 Class I areas. WRAP also developed estimates of aerosol concentrations and visibility for the non-GCVTC Class I areas. The WRAP Regional Modeling Center used the Community Multi-scale air Quality (CMAQ) model to estimate aerosol concentrations from the emission inventories and projections.

The WRAP developed a Technical Support Document (TSD) that contains detailed descriptions of the emissions inventory and projection methods as well as the air quality modeling techniques and results. The following sections contain an overview of the projected changes in emissions and visibility resulting from the implementation of the Regional Haze Rule.

3. Effect on Emissions of Long-term Strategy Components

a. Inventory Methodology and Scope

The base WRAP emission inventories used for assessment of visibility included the following pollutants:

- Volatile Organic Compounds (VOCs);
- Oxides of Nitrogen (NO_x);
- Carbon Monoxide (CO);
- Sulfur Dioxide (SO₂);
- Particulate Matter smaller than 10 microns (PM₁₀);
- Particulate Matter smaller than 2.5 microns (PM_{2.5}); and
- Ammonia (NH₃).

For visibility modeling, the PM_{2.5} emissions inventory was broken into components, or species, representing the key visibility impairing species of interest. This breakdown is necessary since each component has a different effect on visibility. These PM_{2.5} species are organic carbon particles (OC), elemental carbon particles (EC), and other fine particles such as soils and dusts. The factors used to allocate PM_{2.5} into its components are based on source specific speciation factors. In addition, the coarse material (CM) fraction of PM₁₀ (i.e., PM₁₀ minus PM_{2.5}) was also computed, since coarse particulate matter has a different effect on visibility than fine particulate matter.

The geographic domain for the inventory included the 22 states west of the Mississippi River, and portions of Mexico and Canada. A detailed base year emission inventory was developed for 1996 and included emissions from all of the following categories of sources:

- Area Sources;
- Stationary Point Sources;
- Mobile Sources (both on-road and non-road);
- Road Dust (from both paved and unpaved road surfaces);
- Fire Emissions (agricultural burning, prescribed fire, and wild fire); and
- Biogenic Sources.

In addition to the 1996 base year emission inventory used for model validation, a projected base year emission inventory for the year 2018 was developed from the base 1996 inventory and other information related to growth and technology issues. A detailed discussion of the emission inventories and projections is contained at the beginning of Chapter 1 of the WRAP TSD. This 2018 base case emission inventory was then modified to reflect the impact of the additional regional haze control strategies required by the Regional Haze Rule. This is referred to as “2018...(All 309 Control Strategies)” in the tables below.

UDAQ staff reviewed the Utah emission inventory for consistency and provided feedback to WRAP on areas of the inventory that should be improved in the future. UDAQ staff concluded that the 1996 inventory was adequate for regional haze modeling given the uncertainties in any emission inventory process. UDAQ staff also reviewed the 2018 emission growth and projection factors used to develop the 2018 inventory and found the projection to be within the range expected from long range economic projections.

b. Projected Changes in Emissions for Utah

The changes in overall emissions for the State of Utah are summarized in Table 20. As shown, emissions of sulfur dioxide are expected to decrease by 2% by 2018. This reduction is due primarily to the long-term strategy for stationary sources of sulfur dioxide described in Part E that will generate a 16% reduction in emissions from stationary sources by 2018. Also, emissions of oxides of nitrogen and volatile organic compounds are expected to decline by 25% and 29%, respectively, due to the implementation of new federal engine standards and fuel standards described in Part F. Table 21 shows similar emission reductions for the nine-state GCVTC region, except that regionally, sulfur dioxide emissions will be reduced by 22%. The reason Utah’s reduction of sulfur dioxide is smaller than that in the nine states is that the level of pollution controls on facilities in Utah generally is better than that in several other states. The detailed county-level emission inventories for the entire WRAP region are included in the WRAP TSD.

Table 20. Summary of the Change in Emissions from 1996 - 2018 for Utah Sources
(Thousands of Tons per Year)

	VOC	NO _x	SO ₂	PM _{2.5} *	CM
1996	172.2	269.6	66.8	85.4	63.7
2018 w/309	122.4	202.7	65.6	87.3	71.6
% Change	-29%	-25%	-2%	2%	12%

*PM_{2.5} includes organic carbon, elemental carbon, and fine soils/dusts.

Table 21. Changes in Emissions from 1996 – 2018 for 9 GCVTC States

(Thousands of tons per year)

	VOC	NOx	SO ₂	PM _{2.5} *	CM
1996	3,325.3	3,952.1	1,036.3	1,196.7	1,170.6
2018 w/309	2,339.2	2,691.8	808.9	1,228.3	1,198.4
% Change	-30%	-32%	-22%	3%	2%

*PM_{2.5} includes organic carbon, elemental carbon, and fine soils/dusts.

4. Projected Changes in Visual Air Quality

a. Applicable Class I Areas

This projection of visibility improvement covers the 16 Class I areas of the Colorado Plateau, as defined in 40 CFR 51.309(b)(1).

b. Projected Visibility Improvement

Pursuant to 40 CFR 51.309(d)(2), Tables 22 and 23 on the following pages indicate the projected visibility improvement in deciviews³ for each of the 16 Class I areas. These projections were made for the 20% worst days and 20% best days, and is expressed in deciview (dV). The third column represents the expected conditions in 2018 without the implementation of the 309 strategies and programs, and the last column represents expected conditions in 2018 with 309 strategies and programs. These results are from the technical work conducted by the WRAP, which evaluated the visibility improvements resulting from the application of the regional haze control strategies and programs described in Chapter 2 of the WRAP TSD. Chapter 2 and Appendix A of the WRAP TSD describe the control strategies and programs modeled for improvement of visibility by 2018.

³Deciview means a measurement of visibility impairment. Its method of calculation is defined in 40 CFR 51.301, and is reprinted in Appendix A. Lower deciview numbers indicate better visibility, while higher numbers indicate more impaired visibility.

Table 22. Projected Visibility Improvement at the 16 Colorado Plateau Class I Areas in 2018, on the Average 20% Best Visibility Days, Resulting from Implementation of “All §309 Control Strategies”

Colorado Plateau Class I Area	State	2018 - 20% Best Days' Visibility (dV) (Base Case - all controls “on the books” as of 2002)	2018 - 20% Best Days' Visibility (dV) (All §309 Control Strategies)
Grand Canyon National Park	AZ	4.76	4.64
Mount Baldy Wilderness	AZ	5.49	5.36
Petrified Forest National Park	AZ	5.18	5.10
Sycamore Canyon Wilderness	AZ	4.85	4.75
Black Canyon of the Gunnison NP Wilderness	CO	3.89	3.75
Flat Tops Wilderness	CO	3.96	3.81
Maroon Bells Wilderness	CO	3.90	3.80
Mesa Verde National Park	CO	4.40	4.33
Weminuche Wilderness	CO	3.89	3.74
West Elk Wilderness	CO	3.97	3.82
San Pedro Parks Wilderness	NM	5.59	5.36
Arches National Park	UT	4.85	4.61
Bryce Canyon National Park	UT	3.91	3.89
Canyonlands National Park	UT	4.87	4.67
Capital Reef National Park	UT	4.85	4.75
Zion National Park	UT	3.81	3.75

All 16 of the Class I areas show visibility improvements between the base case expected conditions in 2018 without the 309 strategies and programs, and the expected conditions in 2018 with the 309 strategies and programs.

Table 23. Projected Visibility Improvement at the 16 Colorado Plateau Class I Areas in 2018 on the Average 20% Worst Days, Resulting from Implementation of “All §309 Control Strategies”

Colorado Plateau Class I Area	State	2018 – 20% Worst Days’ Visibility (dV) (Base Case – all controls “on the books” as of 2002)	2018 – 20% Worst Days’ Visibility (dV) (All §309 Control Strategies)
Grand Canyon National Park	AZ	11.62	11.51
Mount Baldy Wilderness	AZ	12.22	11.96
Petrified Forest National Park	AZ	11.99	11.74
Sycamore Canyon Wilderness	AZ	11.63	11.48
Black Canyon of the Gunnison NP Wilderness	CO	10.90	10.60
Flat Tops Wilderness	CO	11.04	10.73
Maroon Bells Wilderness	CO	11.15	10.84
Mesa Verde National Park	CO	12.24	11.84
Weminuche Wilderness	CO	11.19	10.84
West Elk Wilderness	CO	11.08	10.72
San Pedro Parks Wilderness	NM	12.33	11.71
Arches National Park	UT	12.41	12.15
Bryce Canyon National Park	UT	12.26	11.95
Canyonlands National Park	UT	12.41	12.18
Capital Reef National Park	UT	12.51	12.36
Zion National Park	UT	12.13	12.03

All 16 of the Class I areas show visibility improvements between the base case expected conditions in 2018 without the 309 strategies and programs, and the expected conditions in 2018 with the 309 strategies and programs.

L. PERIODIC IMPLEMENTATION PLAN REVISIONS

5. Periodic Progress Reports for Demonstrating Reasonable Progress.

Pursuant to 40 CFR 51.309(d)(10)(i), the State of Utah shall submit to EPA, as a SIP revision, periodic progress reports for the years 2008, 2013, and 2018 for the purpose of demonstrating reasonable progress in Class I areas within Utah, and Class I areas outside Utah that are affected by emissions from Utah. This demonstration may be conducted by the WRAP, with assistance from Utah, and shall address the elements listed under 40 CFR 51.309(d)(10)(i)(A) through (G), as summarized below:

1. Implementation status of 2003 SIP measures;
2. Summary of emissions reductions;
3. Assessment of most/least impaired days;
4. Analysis of emission reductions by pollutant;
5. Significant changes in anthropogenic emissions;
6. Assessment of 2003 SIP sufficiency; and
7. Assessment of visibility monitoring strategy.

6. Actions To Be Taken Concurrent with Periodic Progress Reports.

Pursuant to 40 CFR 51.309(d)(10)(ii), the State of Utah shall take one of the following actions based upon information contained in each periodic progress report:

- (1) Provide a negative declaration statement to EPA saying that no implementation plan revision is needed if reasonable progress is being made, in accordance with section L.1 above;
- (2) If the state finds that the implementation plan is inadequate to ensure reasonable progress due to emissions from outside the state, Utah shall notify EPA and the other contributing state(s), and initiate efforts through a regional planning process to address the emissions in question. The State of Utah shall identify in the next progress report the outcome of this regional planning effort, including any additional strategies that were developed to address the plan's deficiencies;
- (3) If the state finds that the implementation plan is inadequate to ensure reasonable progress due to emissions from another country, Utah shall notify EPA and provide information on the impairment being caused by these emissions; or
- (4) If the state finds that the implementation plan is inadequate to ensure reasonable progress due to emissions from within Utah, Utah shall develop additional strategies to address the plan deficiencies and revise the implementation plan no later than one year from the date that the progress report was due.

M. STATE PLANNING/INTERSTATE COORDINATION AND TRIBAL IMPLEMENTATION

7. Participation in Regional Planning and Coordination

Pursuant to 40 CFR 51.309(d)(11), the State of Utah has participated in regional planning and coordination with other states in developing its emission reduction strategies under 40 CFR 51.309, related to protecting the 16 Class I areas of the Colorado Plateau. This participation was through the WRAP.

8. Applicability to Tribal Lands

Pursuant to 40 CFR 51.309(d)(12), and in accordance with the Tribal Authority Rule, the Tribe whose lands are surrounded by the State of Utah have the option to develop a regional haze TIP for their lands to assure reasonable progress in the 16 Class I areas of the Colorado Plateau. As such, no provisions of this chapter of the implementation plan shall be construed as being applicable to tribal lands.

Utah State Implementation Plan

Section XX

Regional Haze

APPENDICES

**Addressing Regional Haze Visibility Protection for the Mandatory
Federal Class I Areas Required Under 40 CFR 51.309**

Complete Document Available On-line at
**[http://www.airquality.utah.gov/SIP/Regionalhazesip/
regionalhaze.htm](http://www.airquality.utah.gov/SIP/Regionalhazesip/regionalhaze.htm)**

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B. DEFINITIONS

1. Applicable Definitions from 40 CFR 51.301, in effect on July 1, 2003

BART-eligible source means an existing stationary facility as defined in this section.

Best Available Retrofit Technology (BART) means an emission limitation based on the degree of reduction achievable through the application of the best system of continuous emission reduction for each pollutant, which is emitted by an existing stationary facility. The emission limitation must be established, on a case-by-case basis, taking into consideration the technology available, the costs of compliance, the energy and non-air quality environmental impacts of compliance, any pollution control equipment in use or in existence at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology.

Deciview means a measurement of visibility impairment. A deciview is a haze index derived from calculated light extinction, such that uniform changes in haziness correspond to uniform incremental changes in perception across the entire range of conditions, from pristine to highly impaired. The deciview haze index is calculated based on the following equation (for the purposes of calculating deciview, the atmospheric light extinction coefficient must be calculated from aerosol measurements):

Deciview haze index = $10^{-1} n_e (b_{\text{ext}}/10 \text{ Mm}^{-1})$.

Where b_{ext} = the atmospheric light extinction coefficient, expressed in inverse megameters (Mm^{-1}).

Existing stationary facility means any of the following stationary sources of air pollutants, including any reconstructed source, which was not in operation prior to August 7, 1962, and was in existence on August 7, 1977, and has the potential to emit 250 tons per year or more of any air pollutant. In determining potential to emit, fugitive emissions, to the extent quantifiable, must be counted.

Fossil-fuel fired steam electric plants of more than 250 million British thermal units per hour heat input,

Coal cleaning plants (thermal dryers),

Kraft pulp mills,

Portland cement plants,

Primary zinc smelters,

Iron and steel mill plants,

Primary aluminum ore reduction plants,

Primary copper smelters,

Municipal incinerators capable of charging more than 250 tons of refuse per day,

Hydrofluoric, sulfuric, and nitric acid plants,

Petroleum refineries,

Lime plants,

Phosphate rock processing plants,

Coke oven batteries,

Sulfur recovery plants,

Carbon black plants (furnace process),

Primary lead smelters,
Fuel conversion plants,
Sintering plants,
Secondary metal production facilities,
Chemical process plants,
Fossil-fuel boilers of more than 250 million British thermal units per hour heat input,
Petroleum storage and transfer facilities with a capacity exceeding 300,000 barrels,
Taconite ore processing facilities,
Glass fiber processing plants, and
Charcoal production facilities.

Federal Class I area means any Federal land that is classified or reclassified Class I.

Federal Land Manager means the Secretary of the department with authority over the Federal Class I area (or the Secretary's designee) or, with respect to Roosevelt-Campobello International Park, the Chairman of the Roosevelt-Campobello International Park Commission.

Federally enforceable means all limitations and conditions which are enforceable by the Administrator under the Clean Air Act including those requirements developed pursuant to parts 60 and 61 of this title, requirements within any applicable State Implementation Plan, and any permit requirements established pursuant to Sec. 52.21 of this chapter or under regulations approved pursuant to part 51, 52, or 60 of this title.

Implementation plan means, for the purposes of this part, any State Implementation Plan, Federal Implementation Plan, or Tribal Implementation Plan.

Indian tribe or tribe means any Indian tribe, band, nation, or other organized group or community, including any Alaska Native village, which is federally recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians.

In existence means that the owner or operator has obtained all necessary preconstruction approvals or permits required by Federal, State, or local air pollution emissions and air quality laws or regulations and either has (1) begun, or caused to begin, a continuous program of physical on-site construction of the facility or (2) entered into binding agreements or contractual obligations, which cannot be cancelled or modified without substantial loss to the owner or operator, to undertake a program of construction of the facility to be completed in a reasonable time.

Least impaired days means the average visibility impairment (measured in deciviews) for the twenty percent of monitored days in a calendar year with the lowest amount of visibility impairment.

Major stationary source and major modification mean major stationary source and major modification, respectively, as defined in Sec. 51.166.

Mandatory Class I Federal Area means any area identified in part 81, subpart D of this title.

Most impaired days means the average visibility impairment (measured in deciviews) for the twenty percent of monitored days in a calendar year with the highest amount of visibility impairment.

Natural conditions includes naturally occurring phenomena that reduce visibility as measured in terms of light extinction, visual range, contrast, or coloration.

Potential to emit means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable. Secondary emissions do not count in determining the potential to emit of a stationary source.

Reasonably attributable means attributable by visual observation or any other technique the State deems appropriate.

Reasonably attributable visibility impairment means visibility impairment that is caused by the emission of air pollutants from one, or a small number of sources.

Regional haze means visibility impairment that is caused by the emission of air pollutants from numerous sources located over a wide geographic area. Such sources include, but are not limited to, major and minor stationary sources, mobile sources, and area sources.

State means "State" as defined in section 302(d) of the CAA.

Stationary Source means any building, structure, facility, or installation, which emits or may emit any air pollutant.

Visibility impairment means any humanly perceptible change in visibility (light extinction, visual range, contrast, coloration) from that which would have existed under natural conditions.

2. Applicable Definitions from 40 CFR 51.309, in effect on July 1, 2003

16 Class I areas means the following mandatory Class I Federal areas on the Colorado Plateau: Grand Canyon National Park, Sycamore Canyon Wilderness, Petrified Forest National Park, Mount Baldy Wilderness, San Pedro Parks Wilderness, Mesa Verde National Park, Weminuche Wilderness, Black Canyon of the Gunnison Wilderness, West Elk Wilderness, Maroon Bells Wilderness, Flat Tops Wilderness, Arches National Park, Canyonlands National Park, Capital Reef National Park, Bryce Canyon National Park, and Zion National Park.

Transport Region State means one of the States that is included within the Transport Region addressed by the Grand Canyon Visibility Transport Commission (Arizona, California, Colorado, Idaho, Nevada, New Mexico, Oregon, Utah, and Wyoming).

Commission Report means the report of the Grand Canyon Visibility Transport Commission entitled "Recommendations for Improving Western Vistas," dated June 10, 1996.

Fire means wildfire, wildland fire (including prescribed natural fire), prescribed fire, and agricultural burning conducted and occurring on Federal, State, and private wildlands and farmlands.

Milestone means the maximum level of annual regional sulfur dioxide emissions for a given year,

assessed annually consistent with paragraph (h)(2) of this section beginning in the year 2003.

Mobile Source Emission Budget means the lowest level of VOC, NO_x, SO₂, elemental and organic carbon, and fine particles which are projected to occur in any area within the transport region from which mobile source emissions are determined to contribute significantly to visibility impairment in any of the 16 Class I areas.

Geographic enhancement means a method, procedure, or process to allow a broad regional strategy, such as a milestone or backstop market trading program designed to achieve greater reasonable progress than BART for regional haze, to accommodate BART for reasonably attributable impairment.

BHP San Manuel means: (i) The copper smelter located in San Manuel, Arizona which operated during 1990, but whose operations were suspended during the year 2000, (ii) The same smelter in the event of a change of name or ownership.

Phelps Dodge Hidalgo means: (i) The copper smelter located in Hidalgo, New Mexico which operated during 1990, but whose operations were suspended during the year 2000, (ii) The same smelter in the event of a change of name or ownership.

3. Definitions for the Fire Program

Agricultural Fuel or Agricultural Burning means any fire ignited by management actions to meet specific objectives (i.e., managed to achieve resource benefits) on agricultural land.

Alternatives to Fire means non-burning techniques that replace fire and that are used to achieve a particular land management objective, including but not limited to reduction of fuel loading, manipulation of fuels, enhancement of wildlife habitat, and ecosystem restructuring.

Emission Reduction Techniques means techniques for controlling emissions from prescribed fires to minimize the amount of emission output per unit or acre burned.

Fire means wildfire, wildland fire(including prescribed natural fire), prescribed fire, and agricultural burning conducted and occurring on federal, state and private wildlands and farmlands.

Land Manager means any federal, state, local, or private entity that owns, administers, directs, oversees or controls the use of public or private land, including the application of fire to the land.

Prescribed fire or **prescribed burn** means any fire ignited by management actions to meet specific objectives, such as achieving resource benefits.

Wildfire means any unwanted, non-structural fire.

Wildland means an area in which development is essentially non-existent, except for pipelines, power lines, roads, railroads, or other transportation or conveyance facilities.

Wildland Fire means all types of fire occurring in the wildland, except for fire on agricultural land.

Wildland Fire Used for Resource Benefits means naturally ignited wildland fire that is managed

to accomplish specific prestated resource management objectives in predefined geographic areas.

4. Definitions for the Western Emission Backstop Trading Program

Account Certificate of Representation means the completed and signed submission required to designate an Account Representative for a WEB source or an Account Representative for a general account.

Account Representative means the individual who is authorized through an Account Certificate of Representation to represent owners and operators of the WEB source with regard to matters under the WEB Trading Program or, for a general account, who is authorized through an Account Certificate of Representation to represent the persons having an ownership interest in allowances in the general account with regard to matters concerning the general account.

Act means the Clean Air Act, as amended, 42 U.S.C. 7401, *et seq.*

Actual Emissions means total annual SO₂ emissions as reported to the executive secretary in accordance with the requirements R307-250-9 or R307-150, as applicable.

Allocate means to assign allowances to a WEB source in accordance with sections XX.E.3.a. through XX.E.3.e of this plan.

Allowance means the limited authorization under the WEB Trading Program to emit one ton of SO₂ during a specified control period or any control period thereafter subject to the terms and conditions for use of unused allowances as established by R307-250.

Allowance limitation means the tonnage of SO₂ emissions authorized by the allowances available for compliance deduction for a WEB source for a control period under R307-250-12(1) on the allowance transfer deadline for that control period.

Allowance Tracking System means the system where allowances under the WEB Trading Program are recorded, held, transferred and deducted.

Allowance Tracking System account means an account in the Allowance Tracking System established for purposes of recording, holding, transferring, and deducting allowances.

Compliance account means an account established in the Allowance Tracking System under R307-250-8(1) for the purpose of recording allowances that a WEB source might hold to demonstrate compliance with its allowance limitation.

Control period means the period beginning January 1 of each year and ending on December 31 of the same year, inclusive.

Emissions tracking database means the central database where SO₂ emissions for WEB sources as recorded and reported in accordance with R307-250 are tracked to determine compliance with allowance limitations.

Emission Unit means any part of a stationary source, which emits or has the potential to emit any pollutant subject to regulation under the Clean Air Act.

EPA Administrator means the Administrator of the United States Environmental Protection Agency or the Administrator's duly authorized representative.

Existing source means a stationary source that commenced operation before the Program Trigger Date.

Floor allocation means the amount of allowances set by the executive secretary in accordance with this Plan that represents the minimum necessary for a source to operate under stringent control assumptions.

General account means an account established in the Allowance Tracking System under R307-250-8 for the purpose of recording allowances held by a person that are not to be used to show compliance with an allowance limitation.

Milestone means the maximum level of stationary source regional sulfur dioxide emissions for each year from 2003 to 2018, established according to the procedures in section XX.E.1 of this plan.

New WEB Source means a WEB source that commenced operation on or after the Program Trigger Date.

New Source Set-aside means a pool of allowances that are available for allocation to new WEB sources and modified WEB sources that have increased capacity in accordance with the provisions of Section E.3.c of this plan.

Opt-in means to choose to participate in the WEB Trading Program by following the procedures in R307-250-4(4) and to comply with the terms and conditions of the R307-250.

Program Trigger Date means the date that the executive secretary determines that the WEB Trading Program has been triggered in accordance with the provisions of section XX.E.1.b of this plan.

Reducible allocation means the amount of allowances set by the executive secretary in accordance with section XX.E.3.a(2)(i) of this plan that represents, for each source, emissions in excess of the floor allocation that shall be reduced over time as the regional milestone is decreased.

Renewable Energy Facility means a facility that generates electricity by non-nuclear and non-fossil technologies that results in low or no air emissions. The term includes electricity generated by wind energy technologies; solar photovoltaic and solar thermal technologies; geothermal technologies; technologies based on landfill gas and biomass sources, and new low-impact hydropower that meets the Low-Impact Hydropower Institute criteria. Biomass includes agricultural, food and wood wastes. For the purposes of this Plan, a renewable energy facility does not include pumped storage or biomass from municipal solid waste, black liquor, or treated wood.

Retired source means a WEB source that has received a retired source exemption as provided in R307-250-4(5).

Stationary source means any building, structure, facility or installation that emits or may emit any air pollutant subject to regulation under the Clean Air Act.

Ton means 2000 pounds and, for any control period, any fraction of a ton equaling 1000 pounds or more shall be treated as one ton and any fraction of a ton equaling less than 1000 pounds shall be treated as zero tons.

Tracking System Administrator means the person designated by the executive secretary as the administrator of the WEB Allowance Tracking System and the emission tracking database.

Tribal Set-Aside means a 20,000-ton SO₂ WEB allowance allocated to tribes on an annual basis. The tribes will decide how to distribute the allowances in the set-aside among tribes in the region. The set-aside is intended to ensure equitable treatment for tribal economies and to prevent barriers to economic development.

Trigger refers to the activation of the WEB Trading Program for SO₂ in accordance with section XX.E.1 of this plan.

WEB source means a stationary source that meets the applicability requirements of R307-250-4

WEB Trading Program refers to the Western Backstop (WEB) Trading Program Rule, R307-250, that shall be triggered as a backstop in accordance the provisions in section XX.E.1 of this plan to ensure that regional SO₂ emissions are reduced.

Western Regional Air Partnership (WRAP) means the collaborative effort of tribal governments, state governments, and federal agencies to promote and monitor implementation of recommendations from the Grand Canyon Visibility Transport Commission authorized under Section 169B(f) of the Clean Air Act, and to address other common Western regional air quality issues.

C. WEB MODEL RULE MONITORING PROTOCOLS

Protocol WEB-1: SO₂ Monitoring of Fuel Gas Combustion Devices

1. Applicability

- (a) The provisions of this protocol are applicable to fuel gas combustion devices at petroleum refineries.
- (b) Fuel gas combustion devices include boilers, process heaters, and flares used to burn fuel gas generated at a petroleum refinery.
- (c) Fuel gas means any gas which is generated and combusted at a petroleum refinery. Fuel gas does not include (1) natural gas, unless combined with other gases generated at a petroleum refinery, (2) gases generated by a catalytic cracking unit catalyst regenerator, (3) gases generated by fluid coking burners, (4) gases combusted to produce sulfur or sulfuric acid, or (5) process upset gases generated due to startup, shutdown, or malfunctions.

2. Monitoring Requirements

- (a) Except as provided in paragraphs (b) and (c) of this Section 2, fuel gas combustion devices shall use a continuous fuel gas monitoring system (CFGMS) to determine the total sulfur content (reported as H₂S) of the fuel gas mixture prior to combustion, and continuous fuel flow meters to determine the amount of fuel gas burned.
 - (1) Fuel gas combustion devices having a common source of fuel gas may be monitored for sulfur content at one location, if monitoring at that location is representative of the sulfur content of the fuel gas being burned in any fuel gas combustion device.
 - (2) The CFGMS shall meet the performance requirements in Performance Specification 2 in Appendix B to 40 CFR Part 60, and the following:
 - (i) Continuously monitor and record the concentration by volume of total sulfur compounds in the gaseous fuel reported as ppmv H₂S.
 - (ii) Have the span value set so that the majority of readings fall between 10 and 95% of the range.
 - (iii) Record negative values of zero drift.
 - (iv) Calibration drift shall be ≤ 5.0% of the span, for initial certification and daily calibration error tests.
 - (v) Methods 15A, 16, or approved alternatives for total sulfur, are the

reference methods for the relative accuracy test. The relative accuracy test shall include a bias test in accordance with paragraph 4.(c) of this section.

- (3) All continuous fuel flow meters shall comply with the provisions of section 2.1.5 of Appendix D to 40 CFR Part 75.
- (4) The hourly mass SO₂ emissions rate for all the fuel gas combustion devices monitored by this approach shall be calculated using the following equation:

$$E_t = (C_s)(Q_t)(K)$$

where: E_t = Total SO₂ emissions in lb/hr from applicable fuel gas combustion devices
 C_s = Sulfur content of the fuel gas as H₂S(ppmv)
 Q_t = Fuel gas flow rate to the applicable fuel gas combustion devices (scf/hr)
 $K = 1.660 \times 10^{-7}$ (lb/scf)/ppmv

- (b) In place of a CFGMS in paragraph (a) of this Section 2, fuel gas combustion devices having a common source of fuel gas may be monitored with an SO₂ CEMS, a flow CEMS, and (if necessary) a moisture monitoring system at only one location, if the CEMS monitoring at that location is representative of the SO₂ emission rate (lb SO₂/scf fuel gas burned) of all applicable fuel gas combustion devices. Continuous fuel flow meters shall be used in accordance with paragraph (a), and the fuel gas combustion device monitored by a CEMS shall have separate fuel metering.
 - (1) Each CEMS for SO₂, flow, and (if applicable) moisture, shall comply with the operating requirements, performance specifications, and quality assurance requirements of 40 CFR Part 75.
 - (2) All continuous fuel flow meters shall comply with the provisions of section 2.1.5 of Appendix D to 40 CFR Part 75.
 - (3) The SO₂ hourly mass emissions rate for all the fuel gas combustion devices monitored by this approach shall be determined by the ratio of the amount of fuel gas burned by the CEMS-monitored fuel gas combustion device to the total fuel gas burned by all applicable fuel gas combustion devices using the following equation:

$$E_t = (E_m)(Q_t)/(Q_m)$$

where: E_t = Total SO₂ emissions in lb/hr from applicable fuel gas combustion devices
 E_m = SO₂ emissions in lb/hr from the CEMS-monitored fuel gas combustion device, calculated using Equation F-1 or (if applicable) F-2 in Appendix F to 40 CFR Part 75

Q_t = Fuel gas flow rate (scf/hr) to the applicable fuel gas combustion devices

Q_m = Fuel gas flow rate (scf/hr) to the CEMS-monitored fuel gas combustion device

(c) In place of a CFGMS in paragraph (a) of this section, fuel gas combustion devices having a common source of fuel gas may be monitored with an SO₂ - diluent CEMS at only one location, if the CEMS monitoring at that location is representative of the SO₂ emission rate (lb SO₂/mmBtu) of all applicable fuel gas combustion devices. If this option is selected, the owner or operator shall conduct fuel gas sampling and analysis for gross calorific value (GCV), and shall use continuous fuel flow metering in accordance with paragraph (a) of this Section 2, with separate fuel metering for the CEMS-monitored fuel gas combustion device.

- (1) Each SO₂-diluent CEMS shall comply with the applicable provisions for SO₂ monitors and diluent monitors in 40 CFR Part 75, and shall use the procedures in section 3 of Appendix F to Part 75 for determining SO₂ emission rate (lb/mmBtu) by substituting the term SO₂ for NO_x in that section, and using a K factor of 1.660×10^{-7} (lb/scf)/ppmv instead of the NO_x K factor.
- (2) All continuous fuel flow meters and fuel gas sampling and analysis for GCV to determine the heat input rate from the fuel gas shall comply with the applicable provisions in sections 2.1.5 and 2.3.4 of Appendix D to 40 CFR Part 75.
- (3) The SO₂ hourly mass emissions rate for all the fuel gas combustion devices monitored by this approach shall be calculated by using the following equation:

$$E_t = (E_m) (Q_t)(GCV)/10^6$$

where:

E_t = Total hourly SO₂ mass emissions in lb/hr from the applicable fuel gas combustion devices

E_m = SO₂ emission rate in lb/mmBtu from the CEMS - monitored fuel gas combustion device

Q_t = Fuel gas flow rate (scf/hr) to the applicable fuel gas combustion devices

GCV = Fuel Gross Calorific Value (Btu/scf)

10^6 = Conversion from Btu to million Btu

(d) Calculate total SO₂ mass emissions for each calendar quarter and each calendar year based on the emissions in lb/hr and Equations F-3 and F-4 in Appendix F to 40 CFR Part 75, Appendix F.

3. Certification/Recertification Requirements

All monitoring systems are subject to initial certification and recertification testing as follows:

- (a) The owner or operator shall comply with the initial testing and calibration requirements in Performance Specification 2 in Appendix B to 40 CFR Part 60 and paragraph 2 (a)(2) of this section for each CFGMS.
- (b) Each CEMS for SO₂ and flow or each SO₂-diluent CEMS shall comply with the testing and calibration requirements specified in 40 CFR Part 75, section 75.20 and Appendices A and B, except that each SO₂-diluent CEMS shall meet the relative accuracy requirements for a NO_x-diluent CEMS (lb/mmBtu).
- (c) A continuous fuel flow meter shall comply with the certification and quality-assurance requirements in sections 2.1.5 and 2.1.6 to Appendix D to 40 CFR Part 75.

4. Quality Assurance/Quality Control Requirements

- (a) A quality assurance/quality control (QA/QC) plan shall be developed and implemented for each CEMS for SO₂ and flow or the SO₂-diluent CEMS in compliance with sections 1, 1.1, and 1.2 of Appendix B to Part 75.
- (b) A QA/QC plan shall be developed and implemented for each continuous fuel flow meter and fuel sampling and analysis in compliance with sections 1, 1.1, and 1.3 of Appendix B to 40 CFR Part 75.
- (c) A QA/QC plan shall be developed and implemented for each CFGMS in compliance with sections 1 and 1.1 of Appendix B to 40 CFR Part 75, and the following:
 - (i) Perform a daily calibration error test of each CFGMS at two gas concentrations, one low level and one high level. Calculate the calibration error as described in Appendix A to 40 CFR Part 75. An out of control period occurs whenever the error is greater than 5.0% of the span value.
 - (ii) In addition to the daily calibration error test, an additional calibration error test shall be performed whenever a daily calibration error test is failed, whenever a monitoring system is returned to service following repairs or corrective actions that may affect the monitor measurements, or after making manual calibration adjustments.
 - (iii) Perform a linearity test once every operating quarter. Calculate the linearity as described in Appendix A to 40 CFR Part 75. An out of control period occurs whenever the linearity error is greater than 5.0 percent of a reference value, and the absolute value of the difference between average monitor response values and a reference value is greater than 5.0 ppm.
 - (iv) Perform a relative accuracy test audit once every four operating quarters.

Calculate the relative accuracy as described in Appendix A to 40 CFR Part 75. An out of control period occurs whenever the relative accuracy is greater than 20.0% of the mean value of the reference method measurements.

- (v) Using the results of the relative accuracy test audit, conduct a bias test in accordance with Appendix A to 40 CFR Part 75, and calculate and apply a bias adjustment factor if required.

5. Missing Data Procedures

- (a) For any period in which valid data are not being recorded by an SO₂ CEMS or flow CEMS specified in this section, missing or invalid data shall be replaced with substitute data in accordance with the requirements in Subpart D of 40 CFR Part 75.
- (b) For any period in which valid data are not being recorded by an SO₂-diluent CEMS specified in this section, missing or invalid data shall be replaced with substitute data on a rate basis (lb/mmBtu) in accordance with the requirements for SO₂ monitors in Subpart D of 40 CFR Part 75.
- (c) For any period in which valid data are not being recorded by a continuous fuel flow meter or for fuel gas GCV sampling and analysis specified in this section, missing or invalid data shall be replaced with substitute data in accordance with missing data requirements in Appendix D to 40 CFR Part 75.
- (d) For any period in which valid data are not being recorded by the CFGMS specified in this section, hourly missing or invalid data shall be replaced with substitute data in accordance with the missing data requirements for units performing hourly gaseous fuel sulfur sampling in section 2.4 of Appendix D to 40 CFR Part 75.

6. Monitoring Plan and Reporting Requirements

In addition to the general monitoring plan and reporting requirements of Section I of this Rule, the owner or operator shall meet the following additional requirements:

- (a) The monitoring plan shall identify each group of units that are monitored by a single monitoring system under this Protocol WEB-1, and the plan shall designate an identifier for the group of units for emissions reporting purposes. For purpose of submitting emissions reports, no apportionment of emissions to the individual units within the group is required.
- (b) If the provisions of paragraphs 2.(b) or (c) are used, provide documentation and an explanation to demonstrate that the SO₂ emission rate from the monitored unit is representative of the rate from non-monitored units.

Protocol WEB-2: Predictive Flow Monitoring Systems for Kilns with Positive Pressure Fabric Filter

1. Applicability

The provisions of this protocol are applicable to cement kilns or lime kilns that (1) are controlled by a positive pressure fabric filter, (2) combust only a single fuel, no fuel blends, and (3) have operating conditions upstream of the fabric filter that the WEB source documents would reasonably prevent reliable flow monitor measurements. This protocol does not modify the SO₂ monitoring requirements in section I of this Rule.

2. Monitoring Requirements

(a) A cement or lime kiln with a positive pressure fabric filter shall use a predictive flow monitoring system (PFMS) to determine the hourly kiln exhaust gas flow.

(b) A PFMS is the total equipment necessary for the determination of exhaust gas flow using process or control device operating parameter measurements and a conversion equation, a graph, or computer program to produce results in cubic feet per hour.

(c) The PFMS shall meet the following performance specifications:

(1) Sensors readings and conversion of sensor data to flow in cubic feet per hour must be automated.

(2) The PFMS must allow for the automatic or manual determination of failed monitors. At a minimum a daily determination must be performed.

(3) The PFMS shall have provisions to check the calibration error of each parameter that is individually measured. The owner or operator shall propose appropriate performance specifications in the initial monitoring plan for all parameters used in the PFMS comparable to the degree of accuracy required for other monitoring systems used to comply with this Rule. The parameters shall be tested at two levels, low: 0 to 20% of full scale, and high: 50 to 100% of full scale. The reference value need not be certified.

(4) The relative accuracy of the PFMS must be $\leq 10.0\%$ of the reference method average value, and include a bias test in accordance with paragraph 4(c) of this section.

3. Certification Requirements

The PFMS is subject to initial certification testing as follows:

- (a) Demonstrate the ability of the PFMS to identify automatically or manually a failed monitor.
- (b) Provide evidence of calibration testing of all monitoring equipment. Any tests conducted within the previous 12 months of operation that are consistent with the QA/QC plan for the PFMS are acceptable for initial certification purposes.
- (c) Perform an initial relative accuracy test over the normal range of operating conditions of the kiln. Using the results of the relative accuracy test audit, conduct a bias test in accordance with Appendix A to 40 CFR Part 75, and calculate and apply a bias adjustment factor if required.

4. Quality Assurance/Quality Control Requirements

A QA/QC plan shall be developed and implemented for each PFMS in compliance with sections 1 and 1.1 of Appendix B of 40 CFR Part 75, and the following:

- (a) Perform a daily monitor failure check.
- (b) Perform calibration tests of all monitors for each parameter included in the PFMS. At a minimum, calibrations shall be conducted prior to each relative accuracy test audit.
- (c) Perform a relative accuracy test audit and accompanying bias test once every four operating quarters. Calculate the relative accuracy (and bias adjustment factor) as described in Appendix A to 40 CFR Part 75. An out of control period occurs whenever the flow relative accuracy is greater than 10.0% of the mean value of the reference method.

5. Missing Data

For any period in which valid data are not being recorded by the PFMS specified in this section, hourly missing or invalid data shall be replaced with substitute data in accordance with the flow monitor missing data requirements for non-load based units in Subpart D of 40 CFR Part 75.

6. Monitoring Plan Requirements

In addition to the general monitoring plan requirements of Section I of this Rule, the owner or operator shall meet the following additional requirements:

- (a) The monitoring plan shall document the reasons why stack flow measurements upstream of the fabric filter are unlikely to provide reliable flow measurements over time.
- (b) The initial monitoring plan shall explain the relationship of the proposed parameters and stack flow, and discuss other parameters considered and the reasons for not using those parameters in the PFMS. The [state or tribe] may require that the subsequent monitoring plan include additional explanation and documentation for the reasonableness of the proposed PFMS.

D. Projection of Visibility Improvement

1. Modeling Scenarios

Improvement in visibility for the 16 Colorado Plateau Class I areas was modeled for two scenarios, the results of which are shown in Tables 22 and 23 in Part K of this SIP.

Control Strategies

The WRAP modeled two control scenarios for 2018, with and without optimal smoke management. The results are found in the WRAP TSD. Scenario 1 is designed to assess the effect of the Grand Canyon Visibility Transport Commission (GCVTC) recommended control strategies, comparing the 1996 modeled base case to the visibility improvement resulting from the implementation of the following GCVTC strategies: the sulfur dioxide Annex Milestones, the regional pollution prevention program, maintenance of existing base smoke management programs, and accounting for the 2018 base case emissions (known and adopted federal, tribal, state, and local control programs in the contiguous WRAP region). Visibility changes resulting from regional implementation of state pollution prevention programs were modeled by the Regional Modeling Center, as part of the other Section 309 control strategies. Visibility changes resulting from implementation of pollution prevention programs by individual states or tribes were not modeled. Emissions changes from state or tribal pollution prevention programs, and the resulting visibility changes are small, based on the regional pollution prevention emissions analysis, but are accounted for in the regional modeling.

Scenario 2 is designed to assess the effect of the implementation of enhanced smoke management programs, as reflected in the WRAP Fire Emissions Joint Forum's 2018 optimal smoke management inventory. Enhanced smoke management programs were recommended by GCVTC and are required in Section 309(d)(6) of the Regional Haze Rule. This scenario uses the emissions inventories from Scenario 1, except the optimal smoke management inventory was substituted for fire emissions. Thus, the results for Scenario 2 are a comparison of visibility changes resulting from emission reductions between the 2018 baseline smoke management and 2018 optimal smoke management fire inventories.

Modeling results projecting visibility improvement in 2018

Visibility at the 16 Class I areas on the Colorado Plateau was estimated for the 2018 Scenario 1 and Scenario 2 control strategies. Tables 22 and 23 display the improvements in visibility from the 2018 base case (i.e., without the strategies included in this Plan) to the 2018 controlled case with all the strategies included in this Plan. In all cases, visibility is expected to be better with this Plan than without it.

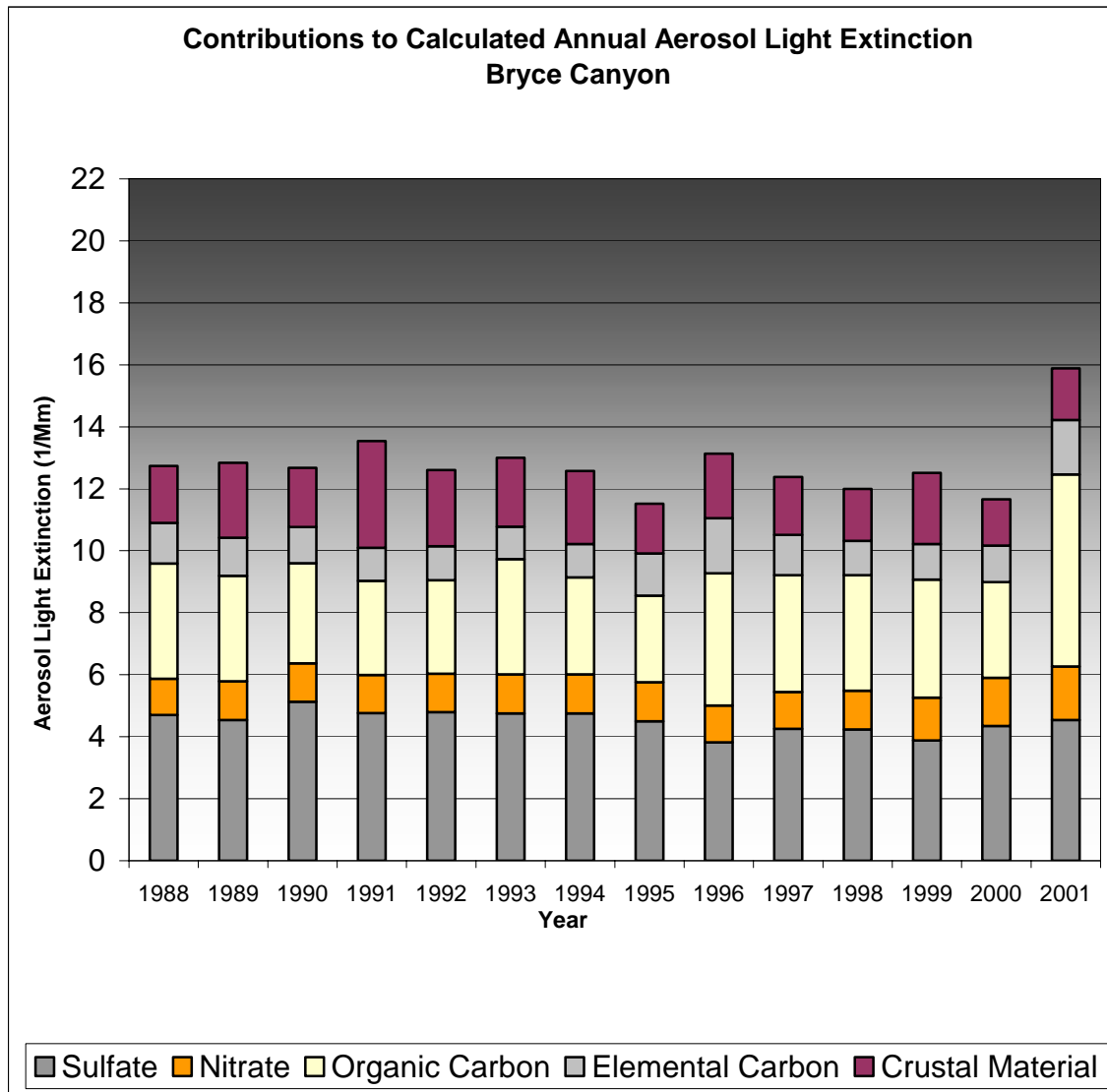
Visibility estimates for Scenarios 1 and 2 are found in the WRAP Technical Support Document, Chapter 2. A comparison of the visibility estimates for 2018 Scenarios 1 and 2 at the 16 Class I areas on the Colorado Plateau for the worst 20% and best 20% days reveals that 2018 Scenario 2 always estimated improved visibility as compared to 2018 Scenario 1. That is, the optimal smoke management programs produces visibility improvements over the base smoke management programs across all 16 Class I areas for both the worst 20% and best 20% days.

1. Visibility Measurements over the Years

The National Park Service conducted visibility monitoring at Utah's parks for many years, but the data is not comparable because improvements in equipment have been made. The only modern data available for a lengthy period is from Bryce and Canyonlands since 1988. IMPROVE monitors were installed at Zion and Capitol Reef in 2001, though the Zion monitor was moved to a more appropriate site in the spring of 2003. There is too little data available from those monitors to draw any conclusions about trends in visibility or the sources of visibility impairment.

Displayed below are charts summarizing more than a decade of data from IMPROVE monitors at Bryce and Canyonlands National Parks. Projections of visibility for 2018 have been added.

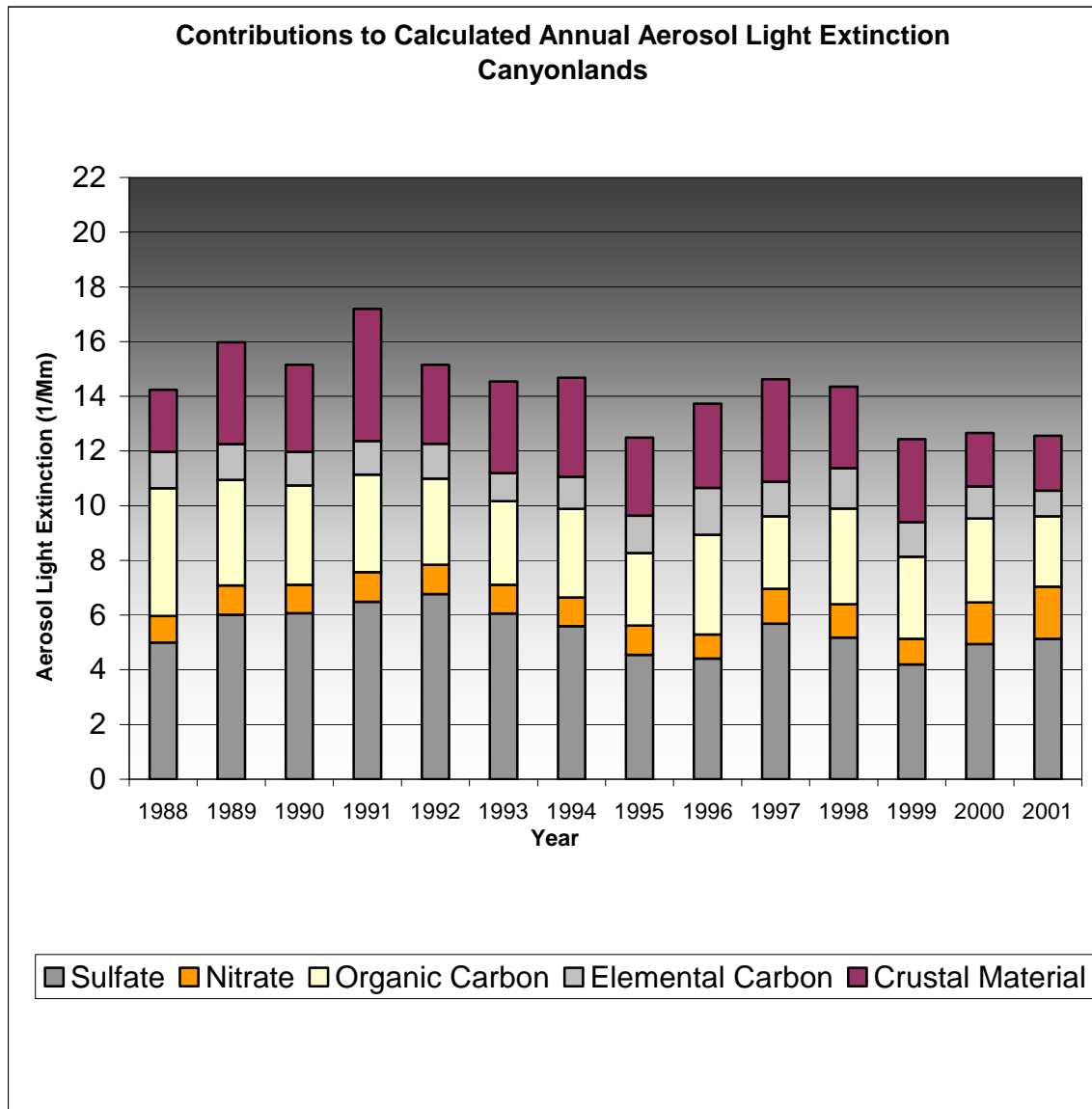
Figure1 Appendix. Contributions to Light Extinction at Bryce Canyon



Sources: 1988-2001 data from IMPROVE Web site.

The only trend apparent in this chart is the small decline in sulfates over the period. Larger amounts of organic and elemental carbon in 1996 and 2001 are probably attributable to fires.

Figure 2 Appendix. Contributions to Light Extinction at Canyonlands



Sources: 1988-2001 data from IMPROVE Web site.

Again, the chart shows a decline in sulfates over the period and a possible small increase in nitrates.